cover, or that loose or infected teeth were involved? If the treatment provided was only fillings performed in a sound mouth would the authors consider that the relationship of dental treatment to the onset of the disease might be fortuitous, especially since it was not possible to isolate the causative organisms to give further evidence?

The answer to this question is of great importance in view of the number of patients for whom dental surgeons routinely provide an antibiotic umbrella before the removal of teeth, but not before filling them.—I am, etc.,

Kingston Hospital,
Surrey. R. A. PEEBLES.

Familial Dysautonomia

SIR,—In a recent report Dr. E. Shinebourne and others (14 October, 1967, p. 91) have confirmed[1] that in children with dysautonomia 2.5% methacholine induces miosis of the pupil, whereas no reaction occurs in normals. When an anticholinesterase drug is given the pupil also contracts, indicating that acetylcholine is being synthesized in parasympathetic nerve endings, although the rate may be reduced or its release impaired. These findings indicate a partial parasympathetic denervation phenomenon.

In addition to these studies they describe pupillary responses to ephedrine. In their subject 2% ephedrine failed to elicit mydriasis, despite the fact that controls exhibited a mean increase in pupillary size of 33%. They suggest that partial sympathetic denervation is responsible for the absent response. It has been shown[3] that infused adrenaline induces an exaggerated hypertensive response in persons with familial dysautonomia, suggesting the possibility of sympathetic denervation supersensitivity. However, the fact that the heart rate of the patient with dysautonomia rises during noradrenaline infusion rather than slowing suggests an absence of the vagal reflex consistent with parasympathetic denervation of the iris. Therefore the exaggerated response to exogenous noradrenaline may be failure to oppose the action of the drug rather than to an intrinsic vascular supersensitivity. Furthermore, there is pharmacological evidence for the presence of catecholamine stores in the iris. Cocaine instilled into the conjunctival sac produces an obvious mydriatic response. But the absence of such a response to a 2% solution of ephedrine does suggest that the catecholamine stores may not be easily released. That a release mechanism may indeed be involved is indicated by the finding that in children with dysautonomia the catecholamine content of the adrenal medulla was much greater than in non-dysautonomic children dying of similar diseases. Evidently the latter depleted their glands under stress of disease. It was concluded that the V.M.A.-H.V.A. defect[4] in dysautonomia is probably related to a sensory deficit rather than to abnormal metabolism or stores of catecholamines.

The possibility of defective release from sympathetic nerves is difficult to reconcile with the clinical observation that during moments of excitement children with dysautonomia are capable of showing blood-pressure elevation in the severe hypertensive range. Although the finding of resistance to the mydriatic effect of ephedrine is most intriguing, there is cogent evidence to suggest that catecholamine deficiency is not the cause of the apparent denervation.—I am, etc.,

ALFRED A. SMITH.
New York Medical College,
New York.

REFERENCES
1 Smith, A. A., Dancis, J., and Breinin, G., *Invest. Ophthal.*, 1965, **4**, 358.
2 Smith, A. A., and Dancis, J., *New Engl. J. Med.*, 1964, **270**, 704.
3 Smith, A. A., and Dancis, J., *New Engl. J. Med.*, 1967, **277**, 61.
4 Smith, A. A., Taylor, T., and Wortis, S. B., *New Engl. J. Med.*, 1963, **268**, 705.

Zinc Sulphate and Bedsores

SIR,—We read with interest Dr. C. Cohen's letter (1 June, p. 561) on the treatment of bedsores with oral zinc sulphate. We certainly agree that further evaluation of the effectiveness of zinc sulphate is required. In collaboration with Dr. T. L. Dormandy and Dr. M. Musa, of the Whittington Hospital, we have been carrying out over the last six months a double blind controlled trial into the effect of oral and local zinc sulphate on the healing rate of pressure sores.

Patients with pressure sores have been randomly placed into three groups. Patients in the first group receive oral zinc sulphate, 200 mg. three times daily, and a placebo solution is applied locally. Those in the second group receive placebo capsules orally, and a 1% solution of zinc sulphate is applied twice daily to the pressure sores. Those in the third group receive both oral and local placebo preparations. Throughout the trial we have borne in mind the importance of assessing the general condition of the patient and of maintaining uniform standards of nursing care—two factors which have a major influence on the rate of healing. All patients have been nursed on large-celled ripple mattresses, and their physical and mental state has been assessed weekly using a scoring system.[1]

The serum and urine zinc levels in our patients have been measured before and weekly during treatment, using the method described by Davies *et al.*[2] These have been compared with the levels in matched control patients. There is a highly significant difference between the mean serum zinc in patients with pressure sores and the controls, the figures being 81 μg./100 ml. and 91 μg./100 ml. respectively.

It is not yet clear whether the use of oral zinc has any advantage over its local application, but it is hoped to publish the results of this trial when it is completed.—We are, etc.,

D. F. ABBOTT.
A. N. EXTON-SMITH.
P. H. MILLARD.
J. M. TEMPERLEY.
St. Pancras Hospital,
London N.W.1.

REFERENCES
1 Bliss, M., McLaren R. and Exton-Smith, A. N., *Brit. med. J.*, 1967, **1**, 394.
2 Davies, I. J. T., Musa, M., and Dormandy, T. L., *J. clin. Path.*, 1968, in press.

Aphthous Ulceration

SIR,—Your correspondent Dr. A. J. Moore (25 May, p. 494) stresses trauma as a cause of aphthous ulcers. Without a doubt trauma can be part of the cause of this troublesome complaint, but it is far from being the sole cause.

An important factor involved must be the change in the resistance to trauma. How else can we explain the freedom from aphthous ulceration which some patients notice only during pregnancy, or the relative freedom in patients while taking oestrogenic anovulants? Does Dr. Moore suggest that the ulceration which some women develop quite regularly in the few days preceding menstruation is due to increased toothbrush trauma at that time? Should such toothbrush trauma not cause gingival ulceration rather than buccal or sublingual ulcers? The observation that aphthous ulcers are rare in the over-60 age group is explained, in my opinion, not by the number of edentulous patients, or by less enthusiastic dental care, but by an increase in the cornification of the mucosa as we age. Aphthous ulcers adjacent to teeth are uncommon, because the gingival mucosa is one of the more keratinized parts of the mouth.

I do not deny that trauma plays a part, but I believe that any advance in our understanding of this condition must come from a study of the defence mechanisms which alter our resistance to trauma.—I am, etc.,

RONALD CARRUTHERS.
Department of Dermatology,
General Hospital,
Launceston, Tasmania.

Aphthous Ulcers and Folate

SIR,—In view of your recent leading articles on aphthous ulcers (20 April, p. 131) and nutritional folate deficiency (18 May, p. 377) the following case may be of interest.

Mr. A. (50 years of age) has a 14-year history of recurrent crops of painful ulcers in the mouth. In 1963 he developed hoarseness due to ulceration adjacent to the larynx, and for a while was treated with prednisone. He had no genital ulcers or uveitis, but was regarded as having an incomplete form of Behçet's disease. He presented at this hospital in January 1968 with pain in the throat, hoarseness, and dysphagia for several months. In addition to scarring and active ulceration of the buccal mucosa, palate, and tongue there was an indurated ulcer extending from the tonsil to the pyriform fossa on the left pharyngeal wall. The right pharyngeal wall was scarred. The right arytenoid was swollen, with the right vocal cord fixed, while another ulcer was seen on the left false cord. There was extensive ulceration and scarring in the postcricoid region. Biopsy of the ulcers was non-specific. A cine barium swallow demonstrated a rigid hypopharynx with spillover into the trachea. He was noted to be anaemic (haemoglobin 10.5 g./100 ml., normochromia, anisocytosis; this had always been normal in previous admissions to other hospitals).

The diagnosis lay between incomplete Behçet's disease and major aphthous ulcers (periadenitis mucosa necrotica recurrens). Treatment with tetracycline mouthwashes, Beta-Corlan pellets, and Adcortyl-A in Orabase produced some relief of pain but little alteration in the appearance of the ulcers. He was discharged on this regimen to be readmitted only three weeks later with an aspiration pneumonia. All his ulcers were unchanged, and there were two fresh ones on his tongue. His haemoglobin had fallen to 6.6 g./100 ml., with M.C.V. 114 cu. μ and M.C.H.C. 29.5%. Marrow picture showed megaloblastic erythropoiesis with poor haemoglobinization despite the presence of abundant iron, consistent with vitamin-B_{12} and/or folate